

ABSTRACT OF THE DISCLOSURE

[0025] A process for micromachining capillaries was having circular cross-sections in glass substrates. Microchannels are isotropically etched into a flat glass substrate, resulting in a semi-circular half-channel (or a rectangle with rounded corners). A second flat glass substrate is then fusion bonded to the first substrate, producing sealed microchannels with rounded bottom corners and a flat top surface having sharp corners. The process is completed by annealing at a sufficiently high temperature (approximately 750C) to allow surface tension forces and diffusional effects to lower the over-all energy of the microchannels by transforming the cross-section to a circular shape. The process can be used to form microchannels with circular cross-sections by etching channels into a glass substrate, then anodically bonding to a silicon wafer and annealing. The process will work with other materials such as polymers.